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10/777,942	02/12/2004	Marcus Duelk	Duelk 3	5360

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EXAMINER	
CURS, NATHAN M	

ART UNIT	PAPER NUMBER
2613	

MAIL DATE	DELIVERY MODE
11/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/777,942	DUELK, MARCUS	
	Examiner	Art Unit	
	Nathan Curs	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,22,24 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7,9-12,14,15,18-20,22 and 24* is/are rejected.

7)☒ Claim(s) *4,6,8,13,16,17 and 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Allowability Withdrawn

1. The indicated allowability of claim 7 is withdrawn in view of the newly discovered reference(s) to Gill et al. ("Gill) (US Patent Application Publication No: 2004/0208429). Rejections based on the newly cited reference(s) follow.

Claim Objections

2. Claims 2, 13 and 24 are objected to because of the following informalities:

Claim 2 recites that the second level corresponds to the second voltage. It appears the applicant meant to recite that the *third* level corresponds to the second voltage, since claim 1 recites that the second voltage is in between the first and third voltages and that the second level can be outside of the voltage range altogether. The second level cannot be both a voltage between the first and third voltages *and* a voltage altogether outside the range established by the first and third voltages.

Claim 13 is missing punctuation.

Claim 24 in line 8 recites "an electrical signal having two or more levels" and then in line 11 recites that "the two or more levels comprise a third level". The applicant is claiming a minimum of three levels in claim 24. The language "two or more" should be changed to reflect that there are at least three levels.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 5, 7, 9-12, 14, 15, 18-20, 22 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Gill (US Patent Application Publication No. 2004/0208429).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 1, Gill discloses a method of signal transmission in a communication system, comprising: transmitting an optical beam through a modulator (fig. 3 and paragraph 0032) adapted to: have a peak of light transmission at a first voltage, substantially block light transmission at a second voltage greater than the first voltage, and have another peak of light transmission at a third voltage greater than the second voltage (fig. 3, where "V-pi" voltages -1, 0 and 1 in the graph and paragraphs 0021-0029 are applicable to the modulator of fig. 3, where the drive voltage value for max transmittance through the modulator is $V\pi$ or $-V\pi$, and so the "V-pi" voltages -1 and 1 in the fig. 3 graph correspond to transmittance peaks, and "V-pi" voltage of 0 corresponds to no transmittance) and driving the modulator with an electrical signal having three or more levels (fig. 3, where the continuous, sinusoidal drive signal has essentially an

infinite number of different levels between max and min; this reads on three or more levels), wherein: a first level is outside of a voltage range between the first and third voltages, said voltage range including the first and third voltages (fig. 3 and paragraph 0032, where the min drive signal level is -1.15Vπ); a second level is either inside the voltage range between the first and third voltages or outside of said voltage range on the opposite side from the first level (fig. 3 and paragraph 0032, where the max drive signal level is 1.15Vπ); and a third level is inside said voltage range (fig. 3 and paragraph 0032, where the no-transmittance drive signal level is zero voltage).

Regarding claim 2, Gill discloses the method of claim 1, wherein the third level corresponds to the second voltage (fig. 3 and paragraph 0032, where the no-transmittance drive signal level is zero voltage).

Regarding claim 3, Gill discloses the method of claim 1, wherein light transmission corresponding to the first level is lower than a peak light transmission (fig. 3, where the peak transmittance for -Vπ is greater than the first level transmittance for -1.15 Vπ).

Regarding claim 5, Gill discloses the method of claim 1, wherein: the second level is inside the voltage range between the first and third voltages and is different from any one of the first, second, and third voltages (fig. 3, the zero drive voltage).

Regarding claim 7, Gill discloses the method of claim 1, wherein: the first level is less than the first voltage (fig. 3, where the first level -1.15 Vπ is less than the first voltage -Vπ); and the second level is greater than the third voltage (fig. 3, where the second level 1.15 Vπ is greater than the third voltage Vπ).

Regarding claim 9, Gill discloses the method of claim 1, wherein a relative optical phase shift for the transmitted optical beam corresponding to the first and second levels is different

than about 180 degrees (paragraph 0032, where a 90 degree phase shift is different than a 180 degree phase shift or an about 180 degree phase shift).

Regarding claim 10, Gill discloses the method of claim 1, wherein the first level is selected based on desired receiver sensitivity at a selected bit error rate (paragraph 0041, where the first level is a feature of the transmitter modulation, and the transmitter modulation as a whole is selected for extend transmission reach at a high bit rate, where selecting the modulation for extended transmission reach reads on selecting the modulation for better receiver sensitivity).

Regarding claim 11, Gill discloses the method of claim 1, wherein the first level is selected based on an eye diagram at a receiver of the communication system (paragraph 0041, where the first level is a feature of the transmitter modulation, and fig. 11 and paragraph 0042, where the eye diagram at the receiver is a characteristic of the modulation itself, and where the transmitter modulation as a whole is selected for extended transmission reach).

Regarding claim 12, Gill discloses the method of claim 1, wherein the modulator is a Mach-Zehnder modulator (fig. 3, element 301 and paragraph 0032) and the communication system is a wavelength division multiplexing (WDM) communication system (paragraph 0001).

Regarding claim 14, Gill discloses a transmitter for a communication system, comprising: a modulator configured to transmit light generated by a light source (fig. 3 and paragraph 0032), wherein the modulator is adapted to: have a peak of light transmission at a first voltage, substantially block light transmission at a second voltage greater than the first voltage, and have another peak of light transmission at a third voltage greater than the second voltage (fig. 3, where "V-pi" voltages -1, 0 and 1 in the graph and paragraphs 0021-0029 are applicable to the modulator of fig. 3, where the drive voltage value for max transmittance through the modulator is $V\pi$ or $-V\pi$, and so the "V-pi" voltages -1 and 1 in the fig. 3 graph correspond to transmittance

peaks, and "V-pi" voltage of 0 corresponds to no transmittance); and a driver configured to drive the modulator with an electrical signal having three or more levels (fig. 3, where the continuous, sinusoidal drive signal is driven by an inherent driver and has essentially an infinite number of different levels between max and min; this reads on three or more levels), wherein: a first level is outside of a voltage range between the first and third voltages, said voltage range including the first and third voltages (fig. 3 and paragraph 0032, where the min drive signal level is $-1.15V\pi$); a second level is either inside the voltage range between the first and third voltages or outside of said voltage range on the opposite side from the first level (fig. 3 and paragraph 0032, where the max drive signal level is $1.15V\pi$); and a third level is inside said voltage range (fig. 3 and paragraph 0032, where the no-transmittance drive signal level is zero voltage).

Regarding claim 15, Gill discloses the transmitter of claim 14, further comprising the light source (fig. 3, the inherent source of the CW optical input to the modulator).

Regarding claim 18, Gill discloses a communication system comprising a transmitter, wherein the transmitter includes: a modulator configured to transmit light generated by a light source (fig. 3 and paragraph 0032), wherein the modulator is adapted to: have a peak of light transmission at a first voltage, substantially block light transmission at a second voltage greater than the first voltage, and have another peak of light transmission at a third voltage greater than the second voltage (fig. 3, where "V-pi" voltages -1, 0 and 1 in the graph and paragraphs 0021-0029 are applicable to the modulator of fig. 3, where the drive voltage value for max transmittance through the modulator is $V\pi$ or $-V\pi$, and so the "V-pi" voltages -1 and 1 in the fig. 3 graph correspond to transmittance peaks, and "V-pi" voltage of 0 corresponds to no transmittance); and a driver configured to drive the modulator with an electrical signal having three or more levels (fig. 3, where the continuous, sinusoidal drive signal is driven by an inherent driver and has essentially an infinite number of different levels between max and min;

this reads on three or more levels), wherein: a first level is outside of a voltage range between the first and third voltages, said voltage range including the first and third voltages (fig. 3 and paragraph 0032, where the min drive signal level is -1.15Vπ); a second level is either inside the voltage range between the first and third voltages or outside of said voltage range on the opposite side from the first level (fig. 3 and paragraph 0032, where the max drive signal level is 1.15Vπ); and a third level is inside said voltage range (fig. 3 and paragraph 0032, where the no-transmittance drive signal level is zero voltage).

Regarding claim 19, Gill discloses the communication system of claim 18, further comprising a receiver configured to receive optical signals from the transmitter via a communication link (paragraph 0001 and claim 1, where the transmitter is for transmitting to a receiver), said link including a link element that is adapted to subject optical signals passing there through to bandpass filtering (paragraph 0041, where the filtering causing RZ pulse overlap reads on bandpass filtering).

Regarding claim 20, Gill discloses the communication system of claim 19, wherein the link element is an optical router (paragraphs 0001 and 0039, where an AWG mux filter in a WDM system is an optical router) and the communication system has multiple instances of the transmitter (paragraph 0001, where a WDM system has multiple transmitters).

Regarding claim 22, Gill discloses apparatus, comprising an optical transmitter coupled to an optical receiver via a communication link (fig. 3 and paragraph 0032 and paragraph 0001 and claim 1, where the transmitter is for transmitting to a receiver), wherein: the optical transmitter comprises: a modulator adapted to modulate an optical beam with data (fig. 3, element 301); and a driver adapted to drive the modulator with an electrical signal corresponding to the data (fig. 3, where the drive signal has an inherent driver); the communication link subjects the modulated beam to bandpass filtering (paragraph 0041, where

the filtering causing RZ pulse overlap reads on bandpass filtering); the modulator is overdriven to introduce a phase shift between optical symbols in the modulated beam (fig. 3 and paragraph 0032, where the drive signal is increase by 15%) such that, at the receiver, inter-symbol interference caused by the bandpass filtering is reduced (paragraph 0041); the modulator is adapted to: have a peak of light transmission at a first voltage, substantially block light transmission at a second voltage greater than the first voltage, and have another peak of light transmission at a third voltage greater than the second voltage (fig. 3, where "V-pi" voltages -1, 0 and 1 in the graph and paragraphs 0021-0029 are applicable to the modulator of fig. 3, where the drive voltage value for max transmittance through the modulator is $V\pi$ or $-V\pi$, and so the "V-pi" voltages -1 and 1 in the fig. 3 graph correspond to transmittance peaks, and "V-pi" voltage of 0 corresponds to no transmittance); and the electrical signal has three or more levels (fig. 3, where the continuous, sinusoidal drive signal is driven by an inherent driver and has essentially an infinite number of different levels between max and min; this reads on three or more levels), wherein: a first level is outside of a voltage range between the first and third voltages, said voltage range including the first and third voltages (fig. 3 and paragraph 0032, where the min drive signal level is $-1.15V\pi$); a second level is either inside the voltage range between the first and third voltages or outside of said voltage range on the opposite side from the first level (fig. 3 and paragraph 0032, where the max drive signal level is $1.15V\pi$); and a third level is inside said voltage range (fig. 3 and paragraph 0032, where the no-transmittance drive signal level is zero voltage).

Regarding claim 24, Gill discloses a method of signal transmission in a communication system (fig. 3 and paragraph 0032), comprising: transmitting an optical beam through a modulator adapted to: have a peak of light transmission at a first voltage, substantially block light transmission at a second voltage greater than the first voltage, and have another peak of

light transmission at a third voltage greater than the second voltage (fig. 3, where "V-pi" voltages -1, 0 and 1 in the graph and paragraphs 0021-0029 are applicable to the modulator of fig. 3, where the drive voltage value for max transmittance through the modulator is Vπ or -Vπ, and so the "V-pi" voltages -1 and 1 in the fig. 3 graph correspond to transmittance peaks, and "V-pi" voltage of 0 corresponds to no transmittance); and driving the modulator with an electrical signal having three or more levels (fig. 3, where the continuous, sinusoidal drive signal is driven by an inherent driver and has essentially an infinite number of different levels between max and min; this reads on three or more levels), wherein: a first level is outside of a voltage range between the first and third voltages (fig. 3 and paragraph 0032, where the min drive signal level is -1.15Vπ); a second level is inside the voltage range between the first and third voltages (fig. 3 and paragraph 0032, where the max drive signal level is 1.15Vπ); a third level outside of the voltage range between the first and third voltages (fig. 3 and paragraph 0032, where the no-transmittance drive signal level is zero voltage); the first level is less than the first voltage (fig. 3, where -1.15Vπ is less than –Vπ); and the third level is greater than the third voltage (fig. 3, where 1.15Vπ is greater than Vπ).

Allowable Subject Matter

5. Claims 4, 6, 8, 13, 16, 17 and 25 are objected to as being dependent upon an objected to and/or rejected base claim, but would be allowable if rewritten to overcome the above objections and if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments filed 19 September 2007, with respect to the rejection(s) of under Price have been fully considered and are persuasive based on the amended independent claims (specifically, the amendments to include the first and third voltages in the claimed voltage range). Therefore, the corresponding rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Gill.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- US Patent Application Publication No. 2004/0253000 – discloses overdriving an MZ modulator using a drive signal with a greater amplitude than the switching voltage (see fig. 2).
- US Patent No. 6671079 – discloses a driving voltage for an MZ modulator where the modulator driving voltage waveform max and min is offset from the transfer characteristic voltages corresponding to the peaks and nulls of the optical waveform output from the modulator (see fig. 5a).

9. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pairdirect.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NMC

JASON CHAN
SUPERVISORY PATENT EXAMINER
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11/25/2007